Thermal Vein Warming System - A Vasodilation Preparation Device for Difficult Venous Access (DIVA) Patients: Enabling NHS access via the Supply Chain Innovation Pathway

NHS Supply Chain

J Birtwhistle, Clinical Specialist, IV Therapy and Devices NHS Supply Chain
joanne.birtwhistle@supplychain.nhs.uk

Background

Peripheral intravenous catheters (PIVCs) are commonly used across acute care settings, particularly in emergency departments, where UK data demonstrates variation in practice and potential overuse in patients with difficult venous access who are at an increased risk of multiple insertion attempts and premature PIVC failure.

PIVC failure remains frequent and can result in premature removal and repeated cannulation, increasing patient discomfort, complication risk, and healthcare resource utilisation. Evidence suggests cannulation is often undertaken as a routine intervention rather than being driven by an ongoing clinical indication. This highlights the need for appropriate cannula use and for strategies that improve first time success, preserve vein integrity, and reduce repeated insertions. These challenges provide a strong rationale for exploring innovations to better support cannulation in clinical practice.

Aim

To examine the available evidence supporting a thermal vein warming system innovation, designed to promote vasodilation prior to cannulation in patients with difficult venous access.

Methods

- A structured evaluative approach was undertaken to assess the clinical, operational, and economic value of the thermal vein warming system. This included review of published evidence and relevant guidance relating to cannulation practices and adjunct technologies.
- Engagement with healthcare professionals currently using the device provided insight into real world experience, usability, and perceived impact on practice.
- High use clinical areas included intensive care units, acute medical and surgical wards, oncology and older adult care wards, and phlebotomy services across both primary and secondary care were included.
- A market assessment was conducted to establish the uniqueness of the device's functionality and explore its sustainability profile.
- Cost considerations were reviewed alongside patient experience and satisfaction measures.

Results

- Evaluation of findings indicate that the thermal vein warming system offers a non-invasive and patient-acceptable approach to vascular preparation.
- Improvement was detected in both comfort and dignity while avoiding the risks associated with warm water immersion, including scalding, spillage, and infection risk.
- Simple operation of the device enabled use by healthcare assistants and by patients themselves, such as during home infusion or pre treatment preparation.
- Thematic synthesis of feedback and evidence suggested potential benefit across diverse patient groups, including more equitable outcomes for patients with difficult venous access, with consistent effectiveness observed across age, body mass index, and sex. This is particularly relevant for older adults, individuals with obesity, and patients with fragile veins, including those receiving long term chemotherapy.
- Clinicians reported perceived improvements in first-attempt cannulation success, reduced need for multiple insertions, indicating potential operational and cost-efficiencies.

Conclusion

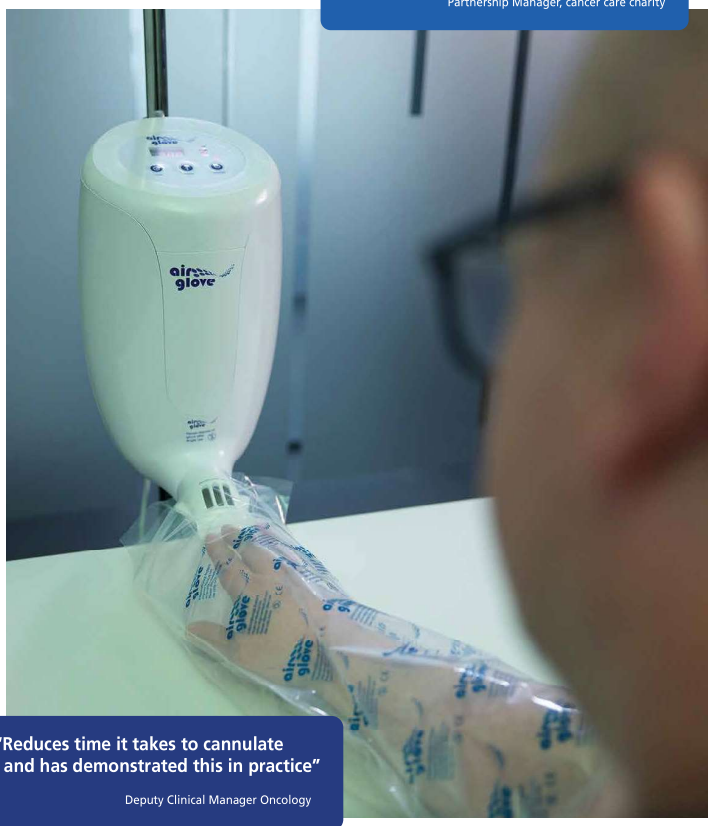
- The reviewed evidence and clinician feedback suggest potential benefits for populations commonly associated with DIVA.
- The thermal vein warming system demonstrates potential to support safer, more consistent cannulation practices and warrants further quantitative evaluation.
- Utilising NHS Supply Chain value based procurement principles and delivering innovation led improvements promotes progressive outcomes, experience, and system efficiency beyond unit cost considerations.

"Patient feedback highlights that the device is comfortable, sterile, and reassuring, avoiding the discomfort of cold, wet clothing or embarrassment associated with water immersion"

Doctor in Research and Innovation

"It has an important part in patient care"

Partnership Manager, cancer care charity



"Reduces time it takes to cannulate and has demonstrated this in practice"

Deputy Clinical Manager Oncology

"Clearly first time cannulation, especially with our haematology patients who have challenging veins it has had a positive impact on care"

Registered Nurse, hospice care

References

- NIVAS (2026) Clinical Standards for Vascular Access and Infusion Therapy 1st Edition (Awaiting RCN Accreditation)
- Alexandrou E et al and the OMG Study Group (2018), Use of Short Peripheral Intravenous Catheters: Characteristics, Management, and Outcomes Worldwide. J. Hosp. Med, 13: E1-E7. https://doi.org/10.12788/jhm.3039
- Evison H, Carrington M, Keijzers G, et al 92022) Peripheral intravenous cannulation decision-making in emergency settings: a qualitative descriptive study. BMJ Open. 12(3):e054927.
- De Cruz et al (2021) Evaluation of the AirgloveTM, An Air-Regulated Thermal-Venodilatory Device Facilitating the Cannulation of Patients With Difficult Venous Access. DOI: 10.21203/rs.3.rs-311478/v1

NIVAS National Infusion and Vascular Access Society